

# Ground Investigation No. AG0678 Factual Report Waunscil Road, Bridgend

August 2018

# **CJ Associates Geotechnical Limited**

King Road Avenue, Bristol, BS11 9HF Tel: 0117 982 1473

# Ground Investigation No. AG0678 Factual Report

Waunscil Ave, Bridgend

# August 2018

Report Status:	Draft	
Issue Number:	1	
Issue Date:	19/09/2018	
Prepared By:	RA	
Signed:		
Checked By:	RA	
Signed:		

Client:

**Mulberry Homes Limited** 45 Preston New Rd, Blackburn BB2 6AE Engineer:

Laurence Rae Associates 53 Park Street Bristol BS1 5NT

Print Date: 19 September 2018

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Print Date: 19 September 2018

# 1.INTRODUCTION

### 1.1 Instruction

C.J. Associates Geotechnical Limited (CJA) was instructed by Mulberry Homes Limited, to carry out a ground investigation at Wauncil Avenue, Bridgend. Instructions to proceed are contained were provided by email.

The development is understood to be an extension of the existing residential site.

# 1.2 Brief and Report Scope

The general specification for the works was provided by Lawrence Rae Associates and incorporated the brief to undertake the following:

- Provide information on ground and groundwater conditions
- Carrying out 4 boreholes, depths from 13 to 17m (total 60m).
- We will need chemical testing of the water samples.

The report presents full factual records of the site work carried out, the ground conditions encountered in the exploratory holes, the in situ and laboratory test results and the results of any monitoring of ground installations.

## 1.3 Limitations

There are no recommendations or opinion expressed in this report. CJA take no responsibility for conditions that have not been revealed by the exploratory holes, or which occur between them. Information provided from other sources is taken in good faith and CJA cannot guarantee its accuracy.

The report has been prepared exclusively for Mulberry Homes Limited, for the site area indicated, and for the purpose stated. CJA accepts no responsibility for any site, client or type of development not indicated in this report.

This report should be reviewed at all stages of construction by someone familiar with the terms and assumptions it contains. It is essential that a suitably qualified and

experienced engineer be appointed for the design of the works, and supervise construction.

# 2.THE SITE

# 2.1 Site Location & Description

The site is located in the Brackla area of Bridgend, South Wales at approximate National Grid reference SS 912 768, and is shown on the Site Location Plan, included in the Appendices to this report, and the aerial photograph below.



At the time of the investigation, the site comprised rough disused ground, formerly a railway cutting (now infilled), bordered to the south, east, and west by residential properties and their gardens, and to the north by woodland and to the south

There was no standing water present at the time of the investigation.

# 2.2 Published Geology

According to the British Geological Survey (BGS) 1:50 000 scale geological map of the area (Sheet No. 261 & 262), the site is underlain by Lower Lias Strata of Jurassic age. The Lower Lias is described in the BGS Regional Guide to the area, as comprising interbedded fossiliferous limestones and grey brown shales

# 3.FIELDWORK

### 3.1 General

The fieldwork, scheduled by LRA was carried out by CJA between 7<sup>th</sup> August 2018 and 11<sup>th</sup> August 208 and comprised, rotary boreholes and the installation of standpipes.

The fieldwork was carried out generally in accordance with BS 5930:2015 *Code of Practice for Site Investigations*, and LRA's instructions, unless otherwise stated. The exploratory hole locations were determined by LRA, and are shown approximately on the Exploratory Hole Location Plan, included in the Appendices.

Instructions from LRA's email 3rd July refer;

- i. We need 4 boreholes, depths from 13 to 17m say 60m.
- ii. The only lab testing will be the four ground water samples. No need to include future site visits with methane monitoring
- iii. We will not need any interpretation. We will drill, set up stand pipes, not record, only take water samples, and test gas for methane.
- iv. We will need chemical testing of the water samples, but no other geotechnical testing. This was fully dealt with in 2008.

All exploratory hole locations were scanned for buried services using a Cable Avoidance Tool (CAT). In addition hand dug inspection pits were excavated to a maximum 1.2m depth before drilling/boring commenced to check for underground services.

On completion all samples recovered from the site were taken to CJA's laboratory for further examination and testing. Details of the depths and types of samples recovered are indicated on the attached log sheets.

# 3.2 Rotary Drilling

5 No. boreholes (designated BHs 1, 2, 3, 4A and 4B) were sunk to depths of between 4.20m and 15.50m below existing ground level, using a track-mounted rotary coring rig.

The boreholes were initially drilled using a down the hole hammer, producing a 120 mm nominal diameter hole.

Details of ground water conditions were noted where possible. Water levels may have been affected by the installation of casing to the boreholes or the use of air / water as a flushing medium. In addition, water level observations are those at the time of the investigation and do not necessarily reflect seasonal or tidal fluctuations.

In accordance with the Client's Engineer's instructions, a 50mm diameter standpipe was were installed in all BH s, at depths of between 6.0 m and 15.5 m below ground level. Installation and backfill details are shown with the appropriate borehole logsheet.

# 3.3 Groundwater / Gas Monitoring

CJA did not carry out groundwater/gas monitoring in standpipes after the fieldwork period.

### 3.4 Contamination tests

The environmental chemistry of the ground was investigated by specialist chemical analysis of selected samples, scheduled by LRA and carried out by Envirolab Laboratories.

Chemical analyses were carried out on 2 no. water samples and were submitted for the following suite of determinants:

Arsenic, Beryllium, Boron, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc, Cyanide, Thiocyanate, Phenol, Sulphate (SO<sub>4</sub>), Sulphide, pH, Sulphur, Soil Organic Matter and Polyaromatic Hydrocarbons (PAH).

The results of the laboratory contamination tests are included in the Appendices to this Report.

The range of potentially hazardous contaminants present on the site can be wide and varied, and the suite has been chosen to reflect both commonly found contaminants and others indicated by research to have a significant risk of being present. It is, however, possible that others may exist for which analyses have not been carried out.

It is also possible that contaminants exist on the site but were not present at any of the exploratory hole locations.

# **4. LIST OF REFERENCES**

Institution of Civil Engineers, Site Investigation Steering Group, Site investigation in construction series, Part 3: Specification for Ground Investigation, Thomas Telford Ltd, 1993.

British Standards Institute, BS 5930: Code of Practice for Site Investigations, 1999.

British Standards Institute, BS 1377: British Standard Methods of Test for Soils for Civil Engineering Purposes, Parts 1 - 9, 1990.

British Geological Survey, Natural Environment Research Council, British Regional Geology, Book 19, South Wales.

# **TABLE 1 - SUMMARY OF EXPLORATORY HOLES**

		Donth	Date	Date		Location		Backfill
Hole	Type*	Depth (m)	Started	Finished	Easting (m)	Northing (m)	Level (mAOD)	Details**
BH1	RO	10.70	08/08	09/08				SP
BH2	RO	15.50	07/08	08/08				SP
BH3	RO	15.50	10/08	11/08				SP
BH4A	RO	4.20	9/08	10/08				SP
BH4B	RO	5.40	9/08	10/08				SP

<sup>\*</sup>CP = cable percussion borehole, RO = rotary open hole, RC = rotary core, WS = Window Sample, TP = Trial Pit, DP = Dynamic probe.

<sup>\*\*</sup>A = Arisings, G = Grout, SP = standpipe

# cjassociates

# **APPENDICES**

# cjassociates

# LOGSHEETS

# Rotary Borehole Log Sheet BH No. BH1

Site: **Brackla** 

Job Number:

AG0678

Client: **Mulberry Homes**  Start Date: 08/09/2018

Finish Date: 09/09/2018

Sheet 1 of 2

# **CJAssociates**

King Road Avenue

**Bristol** BS11 9HF

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# Rotary Borehole Log Sheet BH No. BH1

AG0678

Brackla

Start Date: 08/09/2018

King Road Avenue

**CJAssociates** 

Finish Date: 09/09/2018

Bristol BS11 9HF

Client: Mulberry Homes

Site:

Job Number:

Sheet 2 of 2

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# Rotary Borehole Log Sheet

AG0678

Site:

Client:

Job Number:

BH No. BH2 **Brackla** 

Start Date: 07/09/2018

Finish Date: 08/09/2018

Sheet 1 of 2

King Road Avenue

**CJAssociates** 

**Bristol** BS11 9HF

Tel: 0117 982 1473

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**Mulberry Homes** 

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# Rotary Borehole Log Sheet

Site:

Client:

Job Number:

**Brackla** 

AG0678

**Mulberry Homes** 

BH No. BH2

Start Date: 07/09/2018

Finish Date: 08/09/2018

Sheet 2 of 2

King Road Avenue **Bristol** 

BS11 9HF

Tel: 0117 982 1473

**CJAssociates** 

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# Rotary Borehole Log Sheet

AG0678

**Mulberry Homes** 

Site:

Client:

Job Number:

BH No. BH3 **Brackla** 

Start Date: 10/09/2018

Finish Date: 11/09/2018

Sheet 1 of 2

# **CJAssociates**

King Road Avenue

**Bristol** BS11 9HF

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# Rotary Borehole Log Sheet BH No. BH3

AG0678

Site:

Client:

Job Number:

**Brackla** Start Date:

10/09/2018 Finish Date: 11/09/2018

**Mulberry Homes** Sheet 2 of 2

# **CJAssociates**

King Road Avenue

**Bristol** BS11 9HF

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Core Bit Type:			Barrel:					vation)						:				By: TM
eneral Remar		ection pit han		m. Backfill/Installatio	on: 0.0-0	.2m Co	oncrete	e, 0.2-2	2.0m B	entonite	, 2.0-15.50n	n Gravel.	0.0-1.0 Pla	in Pipe, 1.0	)-15.50m Slot	ted Pipe.	Checke	d By:

# Rotary Borehole Log Sheet BH No. BH4

Site:

Client:

Job Number:

**Brackla** Start Date: 09/09/2018

AG0678 Finish Date: 09/09/2018 **Mulberry Homes** Sheet 1 of 1

# **CJAssociates**

King Road Avenue

**Bristol** BS11 9HF

Rig Type:	:		Comac	chio Geo20	5			Ver	tica	l Sca	ıle: ´	1:50	Tel: 0117 982 147	<b>'</b> 3	
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-										1.20	(1.20)		MADE GROUND: MADE GROUND. (Driller's description).  MADE GROUND: CLAY. (Driller's description).		Awating Awatin
											(3.00)				Ameting Ametin
-										4.20 4.50	(0.30)		LIMESTONE. (Driller's description).  END OF BOREHOLE		Image
-															
-															
-															
		1	Depths in m belo				Flu					ing Record			
Date 09/09/2018 08:00 09/09/2018 17:00	0.00 4.50	0.00 4.50	h Water Depth	Remarks Start of a.m. shift End of BH	From (m	n) To	(m)	Type Air	Reti	urns (%)	Depth (m) 4.50		(mm) Strike Casing Water (20 mins) Sec. 50	No G	emarks roundwater countered
Core Bit Type: General Remai	rks: Insp		e Barrel:	)m. Backfill/Installatio		linates .2m Co	_			Bentonite	e, 2.0-4.50m	Gravel. (	Drilled By: 0.0-1.0 Plain Pipe, 1.0-4.50m Slotted Pip		d By: TM
		4.50m odex											,		•

# Rotary Borehole Log Sheet BH No. BH4a CJAssociates

Site: Brackla Sta

Job Number:

**AG0678** Finish Date: 09/09/2018

Client: Mulberry Homes Sheet 1 of 1

Start Date: 09/09/2018 King Road Avenue

Bristol BS11 9HF

That in the control of the control o	Rig Type	<b>ə</b> :			Coma	cchio Geo	205			Ver	tica	l Sca	le: 1	:50	10	ei: UTT	7 982 14	173	
Table   Property and Time Cloydes in misetance (QL)   Floring   Property and Time (Cloydes in misetance) (QL)   Property and Time (Cloydes in	Depth	ample	Percu Sam Dia. (mm)	ssive ples Rec.	Stand Se (Seatin	lard Penetration Teating / Drive Blowsing / Drive Penetrati	sts (m) union)	Dia	ı. TCR	SCR	RQD	Depth (m)	Thickness (m)	Legend	D	escription (	of Strata	Level	
A - 50   END OF BOREHOLE	-												(1.20)		MADE G GROUNI	ROUND: D. (Driller'	MADRE s description	).	Awatting Awaiting Awa
Hole Plogress with Time (Depths in m below GL)	-											1.20	(3.30)		LIMESTO	ONE (Drill	CLAY, er's		Awatting Awa
Date Hole Depth Casing Depth Water Depth Remarks From (m) To (m) Type Returns (%) Depth (m) Dia. (mm) Strike Casing Water (20 mins) Sealed Remarks 8/09/2018 08:00 0.00 0.00 4.50 Start of a.m. shift End of BH Air 4.50 4.50 4.50 No Groundwater Encountered Core Bit Type:  Core Barrel: Coordinates / (Elevation)  Depth (m) Dia. (mm) Strike Casing Water (20 mins) Sealed Remarks 4.50 4.50 No Groundwater Encountered 5.00 No Groundwater 5.00 No Groundwate	-											4.50			EN	D OF BOI	REHOLE		Awaterdy Awaterdy Awater image Image Image Image Awaterdy Awater Image Image Image Awaterdy Awater Image Image Image Awaterdy Awater Image Image Image Awaterdy Awater Image Image Image Awaterdy Awater Awaterdy Awater Awaterdy Awater Awaterdy Awater Awater Awaterdy Awater
Date Hole Depth Casing Depth Water Depth Remarks From (m) To (m) Type Returns (%) Depth (m) Dia. (mm) Strike Casing Water (20 mins) Sealed Remarks 8/09/2018 08:00 0.00 0.00 4.50 Start of a.m. shift End of BH Air 4.50 4.50 4.50 No Groundwater Encountered Core Bit Type:  Core Barrel: Coordinates / (Elevation)  Depth (m) Dia. (mm) Strike Casing Water (20 mins) Sealed Remarks 4.50 4.50 No Groundwater Encountered 5.00 No Groundwater 5.00 No Groundwate	-																		
Date Hole Depth Casing Depth Water Depth Remarks From (m) To (m) Type Returns (%) Depth (m) Dia. (mm) Strike Casing Water (20 mins) Sealed Remarks 8/09/2018 08:00 0.00 0.00 4.50 Start of a.m. shift End of BH Air 4.50 4.50 4.50 No Groundwater Encountered Core Bit Type:  Core Barrel: Coordinates / (Elevation)  Depth (m) Dia. (mm) Strike Casing Water (20 mins) Sealed Remarks 4.50 4.50 No Groundwater Encountered 5.00 No Groundwater 5.00 No Groundwate	-																		
Date Hole Depth Casing Depth Water Depth Remarks From (m) To (m) Type Returns (%) Depth (m) Dia. (mm) Strike Casing Water (20 mins) Sealed Remarks 8/09/2018 08:00 0.00 0.00 4.50 Start of a.m. shift End of BH Air 4.50 4.50 4.50 No Groundwater Encountered Core Bit Type:  Core Barrel: Coordinates / (Elevation)  Depth (m) Dia. (mm) Strike Casing Water (20 mins) Sealed Remarks 4.50 4.50 No Groundwater Encountered 5.00 No Groundwater 5.00 No Groundwate	-	III. 5		·a. T		halos (C)									•				
2009/2018 08:00   0.00   0.00   0.00   Start of a.m. shift   Air   4.50   4.50   4.50   No Groundwater Encountered					1			(m)		1	D-/	urne (0/)		<u> </u>					
	Date 09/09/2018 08:00 09/09/2018 17:00	0.00		0.00	ptn Water De	Start of a.m. s	hift	(m)	10 (m)		Reti	ırns (%)				ce Casing	Water (20 mins)	No Gi	roundwater
			- 1		1		1	1		1						1			
, , , , , , , , , , , , , , , , , , ,	Core Bit Type:	<u>.</u>		С	ore Barrel:		Con	rdinate	es / (Ele	vation)							Drilled Bv:	RR Loage	d By: TM

# Rotary Borehole Log Sheet BH No. BH4B CJAssociates Site: Brackla Start Date: 10/09/2018

King Road Avenue

Bristol BS11 9HF

Job Number: AG0678 Finish Date: 10/09/2018
Client: Mulberry Homes Sheet 1 of 1

Rig Type: Comacchio Geo205 Vertical Scale: 1:50

Sample / Test																				
Depth (m)		rcussive amples	<u> </u>	Seating / D	etration Tests Prive Blows e Penetration)	Depth (m)	Rota		e Sam		Depth (m)	Thickness (m)	Legend		Desc	ription of	Strata		Reduced Level (m.O.D)	Installation
		n)						(%)		(%)	5.20 5.40 6.00	(5.20) (0.20) (0.60)	ng Record	MADE (Drille LIME descr	E GRO	oUND: Cocription E. (Drille	er's	).	m below (	Awatery Awater
	ole Progres	s with Tim	e (Depths in	m below GL	.)			Flu	ısh			Casir	ng Record			Groundy	vater Strikes (	Depths in	m below (	GL)
Ho	Hole Depth	Casing D	epth Water	Depth	Remarks	From (m	n) To	(m)	Туре	Retu	urns (%)	Depth (m)	Dia.	(mm)	Strike	Casing	Water (20 mins)	Sealed	Re	emarks
		0.00			tart of a.m. shift				Air			6.00		.00		-			No Gr	oundwater
	0.00 6.00	6.00			End of BH														Enc	ountered
Date 0/09/2018 08:00 0/09/2018 17:00	0.00	6.00		ı.	End of BH	Coord	linates	/ (Elev	vation)								Drillad D	v. DD		
Date I	0.00	6.00	Core Barrel	l:	End of BH	Coord	inates	/ (Elev	vation)								Drilled B	y: RR		d By: TM

# LABORATORY TESTS

# **Envirolab Sample Receipt Confirmation**



Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: CJ Associates, King Road, Bristol, BS11 9HF

**Project No:** 18/06568

**Date Instructions Received:** 16/08/2018 (am)

**Date Due:** 22/08/2018

Turnaround: 5 days

Quote No: R-1106

Project: Brackla

Clients Project No: AG0678-L13183-S7014

Client Manager: Danielle Brierley

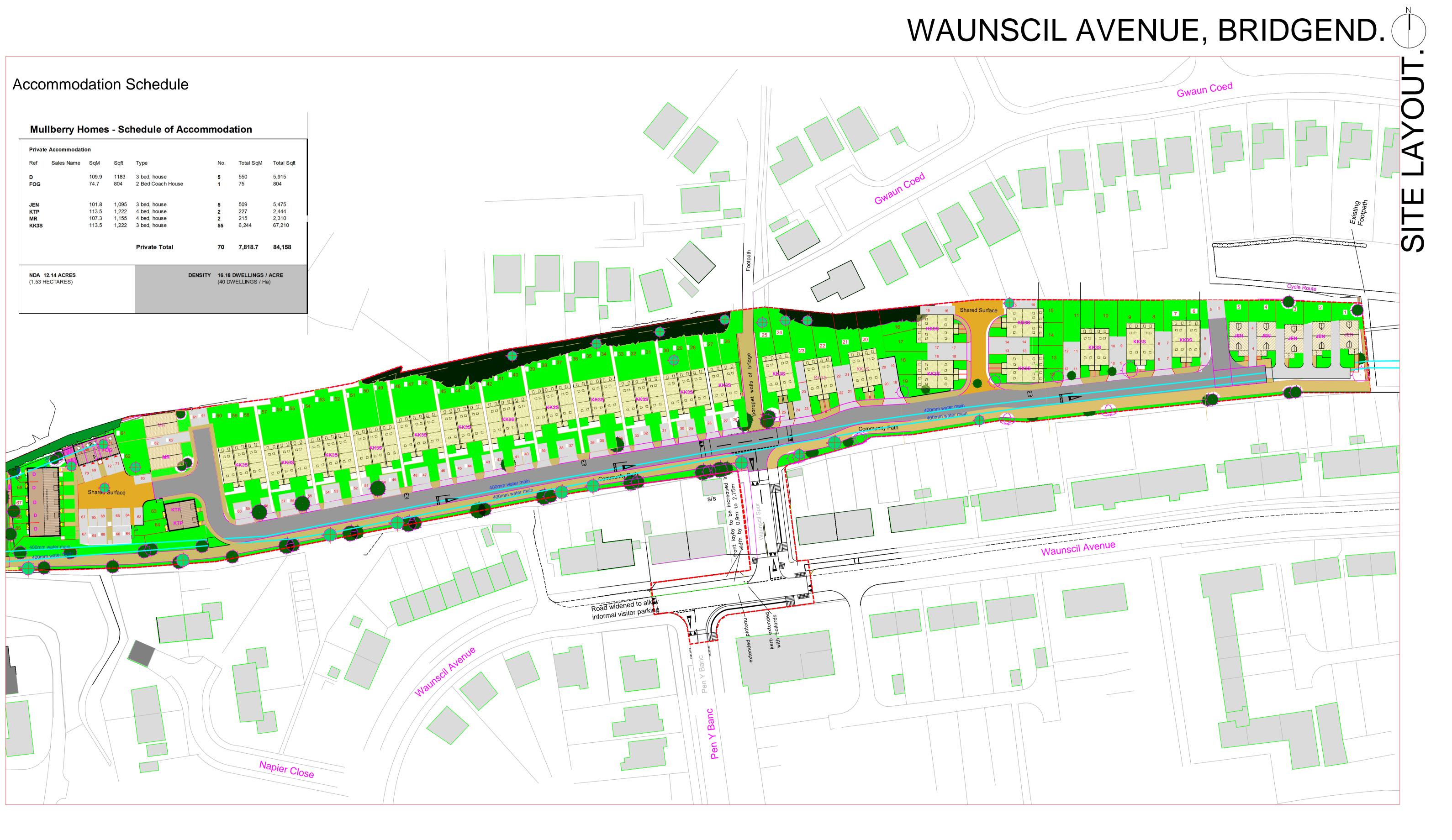
# **Comments:**

Lab Sample ID	18/06568/1	18/06568/2	
Client Sample No			
Client Sample ID/Depth	BH1	BH2	
Sample Type	Water - EW	Water - EW	
Date Sampled	09/08/18	09/08/18	
Containers	1L P x 1	1L P x 1	
Metals (9) (w)	✓	✓	
PAH 16MS (w)	✓	✓	
pH (w)	✓	✓	
Alkalinity by titration (carbonate) (w)	✓	✓	
Hardness Total	✓	✓	
Sulphate (w)	✓	✓	
Cyanide (free) (w)	✓	✓	
Cyanide (total) (w)	✓	✓	
Thiocyanate (w)	✓	✓	
Phenols - Total by HPLC (w)	✓	✓	
Sulphide (w)	✓	✓	
Boron (dissolved)	✓	✓	
Beryllium (dissolved)	✓	✓	
Chromium (hexavalent) (w)	✓	✓	
Vanadium (dissolved)	✓	✓	

**Analysis Summary** 

Analysis	LOD	UKAS (ISO17025)	MCERTS	Method
Metals (9) (w)				
Arsenic (dissolved)	1µg/l	Y	N	A-T-025w
Cadmium (dissolved)	0.2µg/l	Y	N/A	A-T-025w
Copper (dissolved)	1µg/l	Y	N/A	A-T-025w
Chromium (dissolved)	1µg/l	Y	N/A	A-T-025w
Lead (dissolved)	1µg/l	Y	N/A	A-T-025w
Mercury (dissolved)	0.1µg/l	Y	N/A	A-T-025w
Nickel (dissolved)	1µg/l	Y	N/A	A-T-025w
Selenium (dissolved)	1µg/l	Υ	N/A	A-T-025w
Zinc (dissolved)	1µg/l	Y	N/A	A-T-025w
(, , , , , , , , , , , , , , , , , , ,				
PAH 16MS (w)				
Acenaphthene (w)	0.01µg/l	Υ	N	A-T-019w
Acenaphthylene (w)	0.01µg/l	Υ	N	A-T-019w
Anthracene (w)	0.01µg/l	Y	N	A-T-019w
Benzo(a)anthracene (w)	0.01µg/l	Y	N	A-T-019w
Benzo(a)pyrene (w)	0.01µg/l	Υ	N	A-T-019w
Benzo(b)fluoranthene (w)	0.01µg/l	Y	N	A-T-019w
Benzo(ghi)perylene (w)	0.01µg/l	Υ	N	A-T-019w
Benzo(k)fluoranthene (w)	0.01µg/l	Y	N	A-T-019w
Chrysene (w)	0.01µg/l	Y	N/A	A-T-019w
Dibenzo(ah)anthracene (w)	0.01µg/l	Y	N/A	A-T-019w
Fluoranthene (w)	0.01µg/l	Υ	N/A	A-T-019w
Fluorene (w)	0.01µg/l	Y	N/A	A-T-019w
Indeno(123-cd)pyrene (w)	0.01µg/l	Υ	N/A	A-T-019w
Naphthalene (w)	0.01µg/l	Y	N/A	A-T-019w
Phenanthrene (w)	0.01µg/l	Υ	N/A	A-T-019w
Pyrene (w)	0.01µg/l	Y	N/A	A-T-019w
Other Analyses				
pH (w)	0.01pH	Υ	N/A	A-T-031w
Alkalinity by titration (carbonate) (w)	15mg/l Ca CO3	N	N	Titration w
Hardness Total	2mg/l Ca CO3	Υ	N/A	A-T-049w
Sulphate (w)	1mg/l	Υ	N/A	A-T-026w
Cyanide (free) (w)	0.005mg/l	Υ	N/A	A-T-042wFCN
Cyanide (total) (w)	0.005mg/l	Υ	N/A	A-T-042wTCN
Thiocyanate (w)	0.1mg/l	N	N/A	A-T-041w
Phenols - Total by HPLC (w)	0.01mg/l	N	N/A	A-T-050w
Sulphide (w)	0.1mg/l	N	N/A	A-T-S2-w
Boron (dissolved)	10µg/l	Υ	N/A	A-T-025w
Beryllium (dissolved)	1μg/l	Υ	N	A-T-025w
Chromium (hexavalent) (w)	0.01mg/l	Υ	N/A	A-T-040w
Vanadium (dissolved)	1µg/l	Y	N/A	A-T-025w

# **Borehole Location Plan**





# Mullberry Homes Ltd

LOGISTAE HOUSE, 45 PRESTON NEW ROAD, BLACKBURN, LANCASHIRE BB2 6 AE Tel 01254 265550

# project: WAUNSCIL AVENUE, BRIDGEND

title: PLANNING LAYOUT

# client: MULLBERRY HOMES

Revisions

B (7) plots 65,66,and 67

mains easement

omitted, and plots 1-3

relocated on plot for water

Dwg No: **1000-10** Rev: **B** (**7**) job no: **1000** Date: Aug-2014 Scale: 1:500 drawn: ATL-H

Status: Planning

MULLBERRY HOMES

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